

Assignment 1 (non-Lisp portion)

Due: 3:15pm (hand in to TA), Tuesday, Sep. 26

Problem 1 - The Turing Test

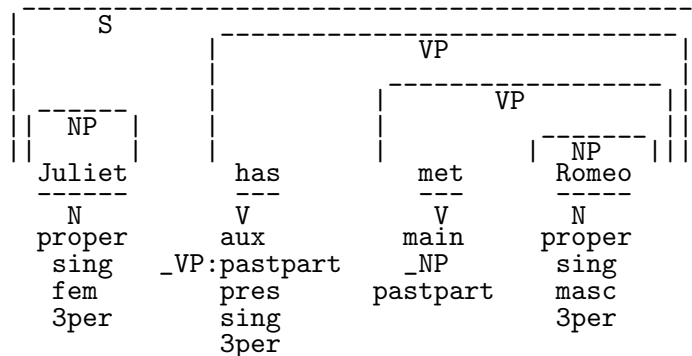
The philosopher Ned Block has argued that the Turing Test is insufficient to establish intelligence in a machine, because at least in principle, a machine could be built that stores a tree of interactions providing a sensible response to each possible interrogator's input in each possible conversational context of up to, say, one hour long. Such a machine will converse successfully and pass the Turing Test without doing any thinking at all; surely such a machine could not be considered intelligent. (Note that such a machine would be even more simplistic than Weizenbaum's ELIZA program, as described in the Allen text, or its many modern cousins, such as ALICE.)

Give your own reaction to this argument. If you agree with Block, then speculate what objections might be raised against the argument, and argue that the objections are invalid. If you disagree, do your best to defeat Block's argument. (In either case, a page or two should suffice.)

Problem 2 - parts of speech and bracketing

Supply the major category (part of speech) of each word in the following sentences. In addition, for determiners indicate the subclass of determiner (article, demonstrative, etc.) and the number (singular or plural). For nouns, indicate whether pronoun, name or common noun and the number, gender, and person.¹ For verbs indicate the subcategorization (i.e., the kinds of complements taken by the verb in this instance), whether auxiliary or main, and the tense (or verb form), number and person. For adjectives, indicate whether ordinal, cardinal (numeral), qualifying, or classifying. In addition, indicate all major phrases (NP, VP, PP, AP, ADVL, R, S). For the first and third sentences (a,c), provide not only the most natural analysis but also a syntactically possible, but semantically unnatural sentential analysis; omit features for these unnatural analyses, i.e., provide major lexical categories and phrase bracketing only.

An example:



¹Common nouns are third person.

- (a) All creatures that live on earth need water regularly
- (b) Noam Chomsky may quite possibly have been monitored by J. Edgar Hoover
- (c) John's busy teaching still life painting
- (d) John's busy teaching schedule during the first two weeks of September nearly caused him to freak out

Problem 3

Exercise 4 (p.37), ch.2 of NLU, with (a) replaced by

- (a) If you distrust your piranhas, give away them.

Problem 4: Exercise 8 (p.38), ch.2 of NLU²

Problem 5 – good and bad phrase structure rules

Critique the following cluster of PSRs, referring to the criteria for evaluating a grammar discussed in class and in the text (conciseness, coordination test, substitution test, extraction test)³

S → NP V[_np] NP	e.g., “Romeo loves Juliet”
→ NP V[_none]	“Romeo sleeps”
→ NP V[be, _ap] AP	“Romeo is asleep”
→ NP V[modal] V[have, base] V[-en, _none]	“He may have slept”

Problem 6 – backtrack parsing

Trace the steps of (a) a top-down and (b) a bottom-up backtrack parse of the following sentence (where the goal is sentence recognition, without explicit assignment of a phrase structure to the input).

Time flies away.

Assume the following grammar and lexicon, and use the rules and lexical categories in the order in which they are given.

S --> VP	Time: V,N
S --> NP VP	flies: N,V
NP --> N	away: PARTIC
VP --> V NP	
VP --> V PARTIC	

²Note the following corrections to Figure 2.11. “Bitransitive” is more often written *ditransitive*. In the second-last line, the example is really an S-complement (which could optionally be prefaced with complementizer *that*), rather than NP+AP. Examples of the latter are *wiped the table clean* and *made Sue happy*.

³Don't critique the rules for incompleteness – assume that these are just a few rules selected from some larger sentence grammar.